

## The Crystal Structure of Molybdopterin Synthase

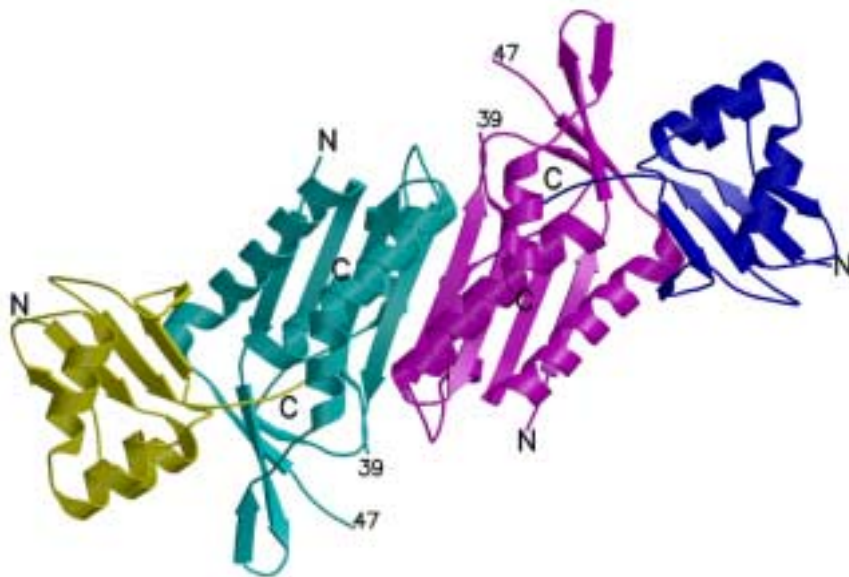
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Abstract No. rudo1587

Beamline(s): X26C, X12C

**Introduction:** The Molybdenum Cofactor is found in all phylogenetic kingdoms of life including humans. The Moco is a tricyclic pyranopterin containing a dithiolene group, which coordinates Molybdenum. Addition of the dithiolene sulfurs to a precursor of molybdopterin, termed precursor Z, requires the  $\alpha_2\beta_2$  heterotetrameric molybdopterin synthase (MPTS). The C terminus of the  $\alpha$  subunit is a modified thiocarboxylate, which is the sulfur donor in the transformation of precursor Z to molybdopterin. The high resolution crystal structure of *Escherichia Coli* MPTS will facilitate a better understanding of the reaction catalyzed by this enzyme and will also provide insight into Moco deficiency due to mutations in the corresponding gene in humans.

**Methods and Materials:** We have solved the crystal structure of MPTS from *E. coli*. The diffraction data were collected at Beamlines X26C and X12C. The crystals belong to the monoclinic spacegroup C2 with unit cell dimensions A=66 Å, B=49 Å, C=76 Å, and  $\beta=107.5^\circ$  with one heterodimer in the asymmetric unit. The structure of MPTS was solved by multiple isomorphous replacement using a platinum derivative (di- $\mu$ -iodobis(ethylenediamine)diplatinum nitrate), a lead derivative ((CH<sub>3</sub>)<sub>3</sub>PbAcetate), and a gold derivative (K[Au(CN)<sub>2</sub>]. The native data set was collected to 1.45 Å resolution with 96 % completeness and a merging R-factor of 5.5 % at Beamline x26C. The data set of the platinum derivative was collected at beamline X12C at the PtLIII absorption edge. The R-factor and free R-factor of the refined model are 15 % and 18 %, including all data from 20 to 1.45 Å resolution.



**Figure 1.** Ribbon diagram of the heterotetramer. The view is along the crystallographic twofold axis of symmetry. The small subunits are shown in yellow and blue, the large subunits in cyan and red.